

New 2,3-di:fluoro-naphthalene derivatives, used as components of liquid crystal mixtures

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Abstract

2,3-difluoronaphthalene derivatives containing not more than 4 rings with 5 or more ring members are new. 2,3-Difluoronaphthalene derivatives of formula (I) with not more than 4 ring systems with 5 or more ring members are new. B = formula (II); R<1>, R<2> = H, OCF₃, CF₃, CN, F, Cl, OCHF₂, OCH₂F, CHF₂ or CH₂F (not more than one of the groups R<1> and R<2> is of type a), (b) 1-20C alkyl (with or without asymmetric carbon), optionally with one or more non-adjacent, non-terminal CH₂ groups replaced by O, S, COO, OCO, OCOO or SiMe₂ and/or with one or more CH₂ replaced by -CH=CH-, -C equivalent to C-, cyclopropane-1,2-diyl, 1,4-phenylene, 1,4-cyclohexene or 1,3-cyclopentene and/or with one or more H replaced by F and/or Cl and/or with the terminal CH₃ groups replaced by one of 20 different optically active or racemic chiral groups (4 examples shown of formulae (III)-(VI)); R<3>-R<7> = (a) H, (b) 1-16C alkyl (with or without asymmetric C), optionally with 1 or more non-adjacent, non-terminal CH₂ replaced by O and/or with one or two CH₂ replaced by -CH=CH- or (c) R<4> + R<5> = -(CH₂)₄- or -(CH₂)₅- if attached to an oxirane, dioxolane, tetrahydrofuran, tetrahydropyran, butyrolactone or valerolactone system; M<1>-M<4> = COO, OCO, COS, SCO, CSO, CSS, OCS, SCS, CH₂O, OCH₂, CH₂S, SCH₂, -CH=CH-, -C equivalent to C-, -CH₂CH₂COO-, -OCOCH₂CH₂- or a single bond; A<1>-A<4> = 1,4-phenylene, pyridine-2,5-diyl or naphthalene-2,6-diyl (optionally with 1 or more H atoms replaced by F, Cl and/or CN in each case), pyrazine-2,5-diyl, pyridazine-3,6-diyl, pyrimidine-2,5-diyl or thiophene-2,5-diyl (all optionally with 1 or 2 H replaced by F, Cl and/or CN), (1,3,4)-thiadiazole-2,5-diyl, 1,3-dioxan-2,5-diyl, 1,3-dithiane-2,5-diyl or 1,3-thiazole-2,4- or -2,5-diyl or thiophene-2,4-diyl (all optionally with one H replaced by F, Cl and/or CN), 1,4-cyclohexene (optionally with 1 or 2 H replaced by CN and/or CH₃ and/or F) or 1-alkyl-1-sila-cyclohexane-1,4-diyl; a, b, c, d = 0 or 1. Independent claims are also included for: (a) liquid crystal (LC) mixtures, especially ferroelectric LC mixtures, containing one or more compounds (I) in amounts of 0.01-80 wt%, and (b) ferroelectric switching and/or display devices containing a ferroelectric LC mixture as in (a) and preferably operated in the Vmin-mode.

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